

Assessment Fact Sheet: Written Examinations

This fact sheet describes the use of written examinations as an assessment method of learning. Topics covered in this fact sheet include:

- the features of written examinations
- the strengths and limitations of written examinations
- best practice principles to inform selection and guide construction of written examinations.

Features of written examinations

Written examinations are typically characterised by supervision and time- restriction for completion.¹ Examinations can include a variety of question types including:

- Multiple choice questions (MCQs); a series of answers where only one of the offered answers is correct.
- True/false (T/F) questions; offer only two opposing answers. T/F questions can effectively diagnose a learner's level of understanding of complex concepts but can be subject to guesswork.
- Matching items: two lists of terms are provided and the learner is asked to match terms from one list with terms on another list in terms of certain specifications.²
- Short answer or structured response questions; formed similarly to MCQs but without the offered answers. Learners have to write an answer into the free space provided for it, emphasis is placed on assessing the ability of a learner to produce an appropriate response, not just identify the correct alternative.³ Learners must know the correct answer to complete structured response questions.⁴
- Extended answers or essays; emphasis is on testing integration and development of hypotheses.¹ In the nursing discipline, examination essay questions usually take the form of two, three or four questions relating to a given patient situation with marks allocated to each question.⁵

Examinations also vary in terms of learner's access to examination questions in advance and to materials during the examination, with the following options available:

- Previously unseen exams; the most common approach to examination. The paper is secure and confidential until the time of the examination.¹
- Closed book exams; learners are not provided with any resources throughout the exam. Traditionalists view the unseen, closed book exam as the only means of preventing plagiarism.⁶
- Exam papers provided in advance; tend to involve extended answers or essays and allow for ample learner preparation and interaction with teaching staff prior to the examination.¹
- Partial open/exams with crib (cheat) sheets; allow the learner to prepare formulas or notes (of stipulated length) for reference throughout the examination period. Crib sheets have been argued to increase learning and decrease stress associated with unseen examinations.⁷
- Open book exams; allow learners access to unlimited resources throughout the examination and are said to support the development of learner study skills, particularly those of weaker students through engagement in the learning process.⁷ Open book examinations are argued to be more congruent with modern learning theory and real life/professional performance.⁶

Examinations, tests and quizzes share many common features however the latter two are typically shorter, used to provide learners with opportunities to assess their knowledge and gain timely feedback on learning.¹

Strengths and limitations

Strengths	Limitations
<p>Practicality and usability</p> <ul style="list-style-type: none"> • Examinations have a long history of use, particularly in science/ health disciplines and their role in measuring learning is widely recognised.^{1,7} • Examinations are efficient, in that they can cover a wide spectrum of the curriculum rather than sample parts of a course as other types of written assessments do.^{3,4} • More MCQ items can be administered in the time it would take to answer a single question essay. • Examinations facilitate quick and simple statistical analysis of achievement against: <ul style="list-style-type: none"> · the whole test, · the individual questions · the learner cohort • Examinations can enable frequent testing of larger numbers of learners, rapid marking and promote the provision of regular feedback.⁸ <p>Reliability and validity</p> <ul style="list-style-type: none"> • MCQ examinations can be useful in competence areas to assess mastery of important knowledge and procedures. • When well constructed, MCQ examinations can go beyond simple assessment of knowledge to assess higher order cognitive skills such as comprehension, application and analysis.⁸ • MCQ provides objective evaluation of performance free from the subjectivity that may exist in the assessment of essays and oral examinations.⁸ • Avoids risks of plagiarism associated with other written assessments • Reliability of marking MCQ is high as there is only one correct answer per question and no assessment of the quality of the answer required.³ • Reliability of the test may be improved by increasing the number of items assessing a topic 	<p>Discrimination</p> <ul style="list-style-type: none"> • Written tests depend on language skills and may favour individuals with-English speaking backgrounds or advanced language skills.⁹ • Time constraints of examinations may prevent learners from demonstrating their capabilities and knowledge. <p>Practicality and usability</p> <ul style="list-style-type: none"> • Constructing good quality questions is complex and time consuming.⁸ • The easiest questions to construct examine only the memorizing of facts.¹⁰ • It is estimated that it requires approximately one hour to construct a good MCQ.⁹ • Examinations typically do not assess generic skills such as interpersonal skills, teamwork or time management.¹ • Some learners find examinations extremely stressful. <p>Reliability and validity</p> <ul style="list-style-type: none"> • It is possible to guess answers from multiple choice options, with four alternative answers, there is a 25 per cent chance of guessing the correct answer.³ Or learners can deduce the right answer by eliminating the incorrect answers therefore real knowledge is not measured. • MCQs may lead to rote learning and results may be distorted by guessing.³ • Essay /extended answer examinations are not reliable. Examiners may allocate different marks to similar scripts based on several factors of potential bias such as quality of handwriting, and marker fatigue. The longer the written response the more difficult to mark in a reliable way as assessors have to make judgements on the quality of the response.³

Best Practice Principles

Preparation and construction

- Ample time is required to construct the exam, allowing for proof reading^{3,8} and to check for ambiguity and unnecessary jargon.¹
- Examination questions should correspond with the curriculum, each question should address one major learning objective.
- A combination between MCQs and short answer questions are preferable to MCQs alone or extended answer examinations.
- Take into consideration the independence of questions, similar themes placed together within an exam paper can provide clues to solving other questions.
- Simple and clear language should be used, avoiding superfluous language or the use of misplaced humour.
- A higher level of questioning should be included where the content needs to be transferable to other situations.²
- Development of a marking scheme is done in advance.¹ An answer guide should be submitted during proof reading to ensure the mark allocation for each question is accurate and that the anticipated answer matches the question.
- All parts of an item should be presented on the same page in a standard format.

Short answer questions

- Short answer questions should invite only brief answers or calculations, as they are useful only when you require learners to recall information.⁴

An example:

Q: What organ is at risk of dose limiting toxicity associated with cumulative lifetime doses of doxorubin?

A: _____

- For a short answer question to exam critical thinking skills they must be written at the cognitive level of application or higher. They involve prioritization, problem solving or multi-logical thinking, eg. two concepts applied systematically and logically to a clinical problem.¹¹

An example:

Q: Part 1: List the common presenting symptoms of Spinal Cord Compression
Part 2: List the specialist cancer nurse's priority actions in response to the symptoms identified.

A: _____

Multiple choice questions (MCQs)

- MCQs should have two major components:
 1. The question or 'stem', and the
 2. Possible answers or 'options' which include the correct answer and several 'distracters' or incorrect answers.^{9,10}

An example:

Stem: When administering doxorubicin, knowledge of its cumulative lifetime maximum dosage is essential because of a risk of toxicity to which organ?

Options:

- a. Liver (distracter)
- b. Heart (correct answer)
- c. Kidneys (distracter)
- d. Lungs (distracter)

Check list for development of MCQs

The stem:

- State the stem in positive, rather than negative, form.⁹
- Stem may be the form of a question or an incomplete statement.¹²
- The use of keywords in the stem should not be repeated in the alternatives as it may provide a clue that this is the correct answer.
- To decrease the risk of repeating redundant words in each alternative answer, relevant material should be placed in the stem.
- Ensure that questions have one, and only one, best answer.⁹

Distracters:

- Provide a minimum of three distracters, to avoid learner guessing.
- The content in the distracters should be related to each other to avoid unnecessary confusion.
- The distracters should be free of clues as to which response is correct.
- The wording in the distracter should be the similar as the correct response as the learner will take note and respond accordingly.
- Using one font, offer uniform, same length answers
- Distracters must be significantly different from the correct answer and be of high quality, appearing plausible solutions to the problem.
- Fillers and implausible distracters add no value to the exam as they do no assist in discriminating high from low level performers.
- Avoid 'all of the above' or 'none of the above' distracters.^{4,10}
- The correct response should be presented in random positions equally to prevent 'burying the response' in the last or first position.

General principles:

- Avoid absolute and vague terms eg. always, never, all, occasionally, usually.⁹
- Ensure that the use of plurals is consistent through the stem and answers to prevent guessing.
- When using the options with numbers each option should be mutually exclusive.
- The same type of measurement (i.e. Kgs) should be used in each part of the MCQ.
- Avoid using verbatim phrasing from a textbook as learners may recognise the phrasing and choose the correct answer based on familiarity rather than ability.
- The lay-out of the test items should be clear and consistent to make the test less confusing for the reader.
- Each MCQ should take on average one minute to read and answer therefore the inclusion of content should take into consideration of the relevance to the question.²

Evaluation and review

- Critical review of the examination paper is best facilitated by a colleague with experience in examination construction.⁸
- A simple measure of the effectiveness of a MCQ is provided by the distribution of learner responses amongst the options. If too many learners select the correct answer, then the distracters may not be convincing or the question may be too simple. If very few learners answer correctly, then the question may not be clear or a deliberately misleading distracter may have been used.¹⁰
- Review learner performance to guide further development of the examination paper.¹⁰
- The technical aspects of the MC items may be best evaluated by someone who is not familiar with the content.

References

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